Due: Wednesday, October 11

HMC Math 142 Fall 2017

Prof. Gu

Problem Set 6

Start this assignment before Sunday night!

Read:

- Baby Do Carmo, Differential Geometry of Curves and Surfaces: Sections 2-4, 2-5, 2-6 and Section 5-10 on Abstract surfaces (starting on page 425)
- Lecture Notes

Do: Please choose one of the following

1. Choose a project of your preference as long as it is related to differential geometry and their applications. Write 2 pages of your work of the project that could be background sections, introduction, development or implementation of an algorithm or a model, some theorems, etc. Identify at least one or a couple research articles. (Note: The project could be selected from pure differential geometry, applications to physics, all the way to big data analytics etc which could even be seclected from our text book. E.g. Summarize in you own words for Abstract Surfaces your have just red starting on page 425.)
2. Choose to work on homework problems. Work on part B, and choose 3 problems that interest you from part C to write up. Keys for part C are attached in resources.
3. Choose half and half. Choose two problems from choice 2 (you can either choose 2 problems from part C or you can choose 1 problem on part C and works out the problem in part B) and one page of work on choice 1

B: Problems from Lectures

- a) Let S be a subset of R^3. Show that S is regular surface if and only if S is locally diffeomorphic to R^2.

C: Problems to choose from

- a) Problem 10 on page 81, Section 2-3, Baby Do Carmo.
- b) Problem 9 on page 89, Section 2-4, Baby Do Carmo.
- c) Problem 15 on page 90, Section 2-4, Baby Do Carmo.
- d) Problem 18 on page 90, Section 2-4, Baby Do Carmo.
- e) Problem 1 on page 99, Section 2-5, Baby Do Carmo.
- f) Problem 3 on page 99, Section 2-5, Baby Do Carmo.
- g) Problem 9 on page 100, Section 2-5, Baby Do Carmo.